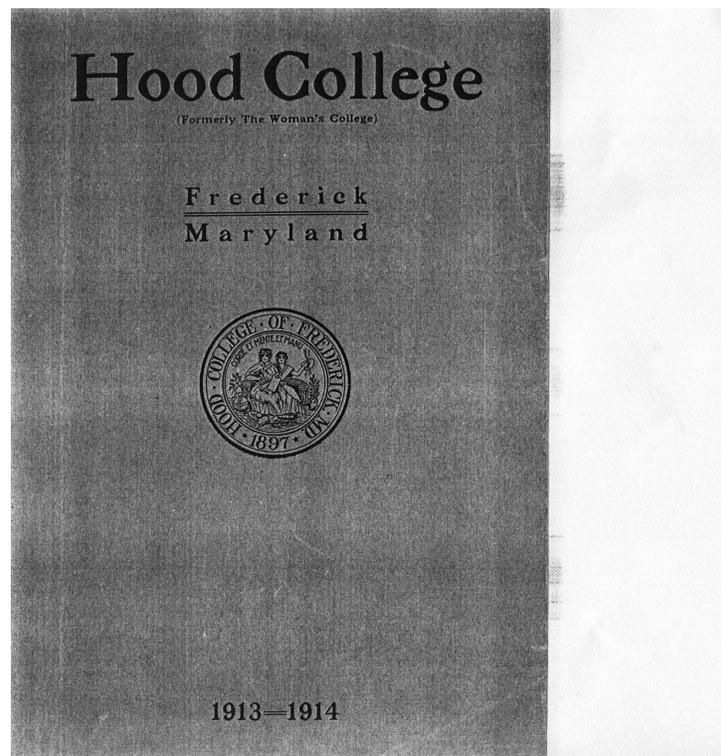


The Development of the Mathematics
Curriculum at Hood College

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Introduction

The requirements for a math major at Hood College have changed drastically over the past one-hundred years. The College has gone from offering seven math courses in 1913 to offering twenty-four in 2013! Not only has the number of offered courses changed, but the courses required to obtain a math degree have also varied greatly. To major in Mathematics in 1913, only fifteen math credits were required (through 4 courses) and that number has increased to 45 today! This paper will take you through the journey that is Hood College Mathematics by revealing how the curriculum has changed so drastically through the examination of small steps of the large change.

The base of this change was the first ten years of Hood College when students had a *major subject*. Then for seventeen years, Hood saw a *major* and *minor*. The third thing Hood College saw lasted for the longest time not including the current, which was the *field of interest*. After the *field of interest* the *major field* was introduced and dropped in just ten years. After that the *major field*, the *major* and *minor* were brought back first with concentrations and then to the current curriculum which does not include concentrations.

Major Subject (1913-1923)

In the first ten years of Hood College, students did not necessarily have a major. Instead, everyone took the same courses for most of their first two years and then chose *major subjects*. From 1913 to 1916, a student would have to choose two *major subjects*, one of which could be Mathematics. To complete the requirements for this *major subject*, all they had to do was complete six credits in the Mathematics department in two consecutive semesters, which could not be done until they completed the two math courses required of all girls attending Hood – Solid Geometry and Plane Trigonometry. So when they graduated they would have been required to complete just four Mathematics courses. This number may seem low, but at the time only nine courses were offered, so they did take almost half of the offerings. In 1917, to get a more focused subject, students were only required to have one *major subject* that would now consist of twelve credit hours. The number of courses offered also increased to eleven, adding two new courses and retaining the other nine. With these major subjects, students had a lot of freedom in which courses they would take, as long as they had the required number of math credits by the time they graduated, they would have a math major subject. They were not required to take certain courses in the department, only pre-requisites could hold them back from taking any courses they wanted.

Luckily, the method of a *major subject* did not last for too long and students were required to concentrate on math more by taking more courses.

Commencement of the Major and Minor (1924-1941)

In 1924, the *major subject* was dropped and the *major* and *minor* we know today were first introduced to Hood College. Not directly related to math majors, but this year also marked the first time that students did not have to take any math courses to fulfill their core. Students still had a lot of freedom in which courses they would take to acquire a degree in mathematics. While they did not have to take certain courses, students were finally required to take a more significant amount of mathematics. All majors were required to take a minimum of twenty-one math credits and were not allowed to take more than thirty credits. In 1924, the College had also increased their number of math classes up to sixteen. In doing so, they kept many of their courses, but also dropped a few and compiled most of lower level courses into just a few classes. Then in 1934, the College said that students are not only required to have a major with twenty-one credit hours, but they must also have a minor where they take twelve credit hours in a different subject. This year also marked the first time that courses were numbered by hundreds, rather than just single digits (previously the math courses were math 1, math 2, math

3,...) and the first time that classes where students received a grade below a “C” would not be counted towards the students major. As far as the course offerings went at this time, with the new advancement in the numbering of courses, a lot of new courses were offered and a few lost, along with Methods of Teaching Mathematics being given back to the Education department. An interesting course that was added to the math department was accounting, which of course is no longer a math course, and was not for long. While all of this was significant, the biggest leap that was made in this time period was that specific requirements were placed on students to receive a degree in Mathematics. Students could no long just take twenty-one math credits, instead they were required to take Plane Analytic Geometry, Calculus I and II, Solid Analytic Geometry/Advanced Calculus, Differential Equations and one addition course in the department of their choosing. Finally before losing the major and minor system for a short period of time, the requirements were changed again to say that a student must take Elementary Math Analysis in place of Plane Analytic Geometry and did not have to take Differential Equations, as neither were offered any more. Although we have majors and minors today, this concept did not stick around for too long when it was originally introduced and was quickly replaced with an idea of a large field

of study.

Introduction to Fields of Interest (1942-1969)

In 1942, the concept of a *major* and *minor* were dropped and a new concept was picked up to replace it: the *field of interest*. In this scheme, a student also picked a core subject that was even more specific and they were required to take between eighteen to thirty credits of that core. To fulfill a core of math, you were required to take Advanced Algebra, Analytic Geometry, Calculus I and II, Advanced Calculus, and Solid Analytic Geometry. Most of the courses remained the same at this time, but a few new and interesting courses were added. Modern Geometry, a course still offered today, was beginning to be taught, albeit rarely along with Differential equations coming back “If there was enough interest.” A final interesting course that was added in 1942 was simply titled *Reading*, in which students would work on their critical reading skills, something not emphasized on too often today. A final thing that I was surprised to find was that students were also required to pass a comprehensive exam in the spring of their senior year to make sure that they still knew everything that they had learned. If the students passed their exam, not only were they going to be awarded a degree in mathematics, but they were also eligible to forgo all of their final exams in math classes that

semester. Until 1958, not much changed in the department, the aforementioned reading course was required to graduate, a new course called *special study* was introduced and Solid Analytic Geometry was no long required. Then in 1958, students gained back some of the freedom that they once had with the math curriculum. Rather than being required to take eight specific courses, students were now only required to take Calculus I and II, Intermediate Calculus, and had to pick two courses from Theory of Equations, Differential Equations, and Modern Algebra. This only totaled up to fifteen credits, and of course eighteen were required to graduate, but students had many more options at this point. Then five years later, even more freedom was awarded. First, students that were math and secondary education majors could take the first half of Intermediate Calculus and Modern Algebra if they were doing their student teaching. On top of that, students now only had to take Calculus I and II, the two courses just mentioned and had a choice of Introduction to Applied Mathematics or Introduction to Analysis. The Seminar was reintroduced that year as well and while it was not required students were expected to take it until it was dropped again about ten years later. The final change before *field of interest* was lost was an increase in the required core credits from eighteen to twenty-one. When this increase hap-

pened, three new courses were also added, Probability, Numerical Methods, and Mathematical Statistics. The *Field of Interest* did stick around for quite some time, almost thirty years, before it was finally removed and replaced with a much more perishable idea.

The Major Field (1970-1981)

In 1970, the next concept a student had to overcome to be awarded a degree in Mathematics was the *Major Field*. Not much different than the *Field of Interest*, in the major field a student was required to take between twenty-four and sixty credits within the Mathematics department. With twenty-four credits required, students had a lot of choices as they only had fifteen required credits. Those courses were Calculus I, and II, Intermediate Calculus which replaced Calculus III, Linear Algebra, and their choice of Calculus IV or Real Analysis I. At this time, the CUPM also recommended that mathematics students take Probability, Algebraic Structures, Applied Mathematics, and Introductory Real Variable Theory. They were also recommending that schools offering different requirements for students who wanted to go into applied and mathematics and students who wanted to continue to study and work on a masters degree or PhD. At this point, many courses were renumbered and a lot were beginning to look like the

courses offered at Hood College today. For example, Calculus I and II were numbered Math 201 and Math 202, and many others followed suit. Along with this renumbering was the change in many names of courses to what we see today and the addition and subtraction of many courses. For example, Modern Algebra was changed to Linear Algebra, Algebraic Structures was added, Modern Geometry became a regularly available course, Calculus IV and Numerical Analysis were added and Introduction to Analysis was replaced by two courses; Real Analysis I and II. The aforementioned requirements basically stayed the same over the next ten years, but math education majors Modern Geometry, Probability and Introduction to Computing were also required. Near the end of the *Major Field*, a few additions and a sad loss were seen in the math department. The additions were Finite Math; a course very closely related to our Discrete Math, Computer Modeling and Simulation; a course still offered today, Language Structure of Computers, and Probability. With all of these additions, it was only natural that some courses would need to be dropped. Senior Seminar was dropped from the curriculum and not seen again for around twenty years. The *Major Field* was not kept for very long before the *major* and *minor* were added and concentrations were offered for the first and only time at Hood College.

The Awakening of Concentrations (1981-1998)

In the early eighties, the requirements for the major made its final big change that is similar to what we have today and *concentrations* were introduced in the mathematics department. With the return of the major and minor, students were also required to take twenty-four credits of math courses at the 200 level or above. Students were also required for the first time to have a 2.0 GPA in Mathematics by the time they graduate, a stipulation still in existence today. Discrete Math I and II replaced Finite Math, Calculus IV with Differential Equations and Real Analysis I and II were compressed into one course. In 1984, the requirements for the major were changed to look very similar to our curriculum today. Students were required to get a C or better in Calculus I, II and III, Discrete Math I and II, Linear Algebra, Differential Equations or Numerical Analysis, Real Analysis or Algebraic Structures, Modeling and Simulation or Statistics, and Introduction to Computing. For the first time students were required to take a class in the computer science field in order to graduate. All of these courses were suggested in the 1991 CUPM guide as they recommended nine courses as well including a course in computing. Along with these changes, three concentrations were offered within the math department; Abstract Mathematics, Applied Mathematics,

and Computing. In order to have a concentration in Abstract Mathematics, students were required to fulfill the aforementioned classes and take Logical Inquiry Through Modern Geometry, Algebraic Structures, Real Analysis, an Independent Study, and six Additional 300-400 level credits in theoretical math. For the Applied Mathematics concentration, students were required to take Differential Equations, Modeling, Statistics, Numerical analysis, and three additional 300-400 level credits in the applied mathematics field. Lastly, for the computing concentration, students were required to take Advanced computer Programming, Language and Structure of Computers, Modeling and Simulation, Numerical Analysis, and three additional 300-400 level credits in the computing field. In the late eighties, a few changes were made yet again, Intermediate Analysis began to be required, and the combination of courses that students had the option to take were changed to look even more similar to our choices today. Students now had a choice between Differential Equations and Statistics, Modeling and Simulation and Numerical Analysis, and Real Analysis and Algebraic Structures. Finally, the requirements matched what we have today except that we are required to take both Real Analysis and Algebraic Structures (Introduction to Abstract Algebra) and there was still no Seminar. It was not long before the former was changed,

along with Discrete Math I and II being pushed into just one course. In 1993, two new double numbered courses began to be offered; Operations Research and Applied Statistics for Quality and Productivity. Also, in 1997 Intermediate Analysis became Introduction to Abstract Mathematics and Applied Calculus began to be offered. The final big change in this period was the revival of the Seminar! During the *Concentrations* time period, the curriculum made its final leap and bounds toward the curriculum we have today where still not much has changed.

***The Demise of Concentrations and the Current Curriculum
(1999-2013)***

In 1999, *concentrations* were removed and have not been seen since. In that same year, Senior Seminar was required again and the curriculum required for seniors of the class of 2013 was completed. In 2002, Introduction to Graph Theory was offered for the first time as a double numbered course and has been offered every other year since. Then, in the next year, Elementary Number Theory was added as a double numbered course and has also been offered every other year since. Then, the very next year, 2004, Algebraic Structures was changed to Introduction to Abstract Algebra. Also in 2004, Applied Calculus was dropped and replaced with a Calculus lab in 2006.

Over the next six years, not much changed in the math curriculum. The next changes have still not even taken place but are set to for the 2013-2014 school year. With these changes, all 300 level math courses are set to go from three credits to four credits. Also, for the first time in thirty years, students will not have to take any courses from the computer science department! All of these changes bring us up to date on the Mathematics Curriculum at Hood College, an incredible amount of change in just 100 years!

Closing

The Mathematics Curriculum at Hood College has changed in so many different ways in just 100 years that it is almost unbelievable. The department has offered many different types of a *major* along the way and has progressively made it more difficult to attain a degree in mathematics. Students have gone from having to take just a few courses of their choosing to being required to take many courses with few being of any choice at all. This has allowed students to have a much better understanding of the subject by the time they graduate and actually take pride in their mathematical education at Hood College. While many courses were added and taken away throughout the time, primarily due to suggestions from The Committee on the Undergraduate Program in Mathematics, it is clear by the longstanding

courses that have molded the department that we are currently taking the most important courses to prepare us for both graduate student and real world application. It is however unfortunate that concentrations did not last for a very long time and were removed as they allowed students to show which part of mathematics that they enjoyed most and pursue that specific field which would arguably prepare them better for whichever of the above they planned to pursue. It is also unfortunate that computer science courses are also being removed from the curriculum as they are important and some math students may never even think to take them. But this is necessary in order to add even more math into the curriculum which, of course, is more important.

References

- [1] MAA, . A compendium of CUPM recommendations : studies, discussions and recommendations. 1. 1-2. Washington, D.C.: Mathematical Association of America, 1975. Print.

The Mathematical Association of America does a great job summarizing what recommendations were made on the mathematics curriculum from 1965 to 1972, having only begun in 1953. They go through all of the classes that were recommended to be added and dropped for mathematics majors and gave very good reasons for these decisions. The intended audience of this book is clearly those who decide the curriculum for mathematics for a given school. This piece is a lot like the next book I have cited, but not nearly as recent which allows it to pertain more to the history, but both cover about the same amount of material. While this is a brilliantly written book, it will only be able to contribute a little bit to my topic, specifically when the changes that were made in this short time period are examined. With that being said, it will allow for a much better examination of these time periods.

- [2] MAA, . The Undergraduate Major in the Mathematical sciences: Wash-

ington, D.C.: Mathematical Association of America, 1991. Web.

Another publication by the Mathematical Association of America, this CUPM guide advises to many courses that college students should take. This is a good source, but some of the recommendations are a bit vague. It still gives a more specific guide than many of the others though, so it is a good source. The intended audience of this publication is Curriculum Committees at different colleges across the country, specifically when they are looking at the math curriculum. This will help me to see why some of the changes were made in the nineties to the curriculum. Unfortunately, not many of these guides were published, many big changes were made in between these publications so they are only as useful as the college has allowed with its changes.

- [3] MAA, . Undergraduate Programs and Courses in the Mathematical Sciences: CUPM Curriculum Guide 2004. Washington, D.C.: Mathematical Association of America, 2004. Web.

The Mathematical Association of America continues to do the curriculum respect with their 2004 edition of the curriculum guide. In this guide, they outline which courses should be added and taken out of the curricu-

lum with great explanations and specifications depending on what the students goals are. Just like the other guide, the intended audience is anyone who is in charge, or part of a committee that writes the math curriculum for a school. Much like the aforementioned compendium, this a good, and even more concise guide, and it pertains to a completely different time period. This work will surely help my project when I examine the most recent changes to curriculum as it will give me more insight on why these changes were made. Again, this will only help with very recent examinations, but will definitely help to exemplify these examinations.

- [4] Hood. Hood College. Curriculum Committee Minutes. Frederick, MD: , 1970-2012. Print.

The documents from the Hood College Curriculum entail all the additions, deletions, and changes made to the math curriculum from 1970 to the current year. The records kept are very meticulous and allow for more background information on what is shown in the catalogs. It also has some things that are very hard to spot, such as course names being changed, and courses being merged or separated. The intended audience of these documents is anyone that wants to see how the curriculum came about or what happen between the curriculum committee in a given year.

These documents are much like the Hood Catalogs but give some different perspective and reasons for the changes. The documents illuminate my work by providing more background information on the changes that will be the centerfold of my project.

[5] Hood Catalogs. Frederick, MD: Hood College, 1913-2012. Print.

The Hood Catalogs are all beautifully done and well kept by the library. These catalogs keep track of which courses are offered each calendar year and in the most recent addition courses that are offered but may not be offered for the specific year. The intended audience of these catalogs is the student body of the given year so that they know which courses they can take, and which are required to obtain a degree in a specific field, mathematics being the field of interest here. These catalogs will be the main resource used in my project because they have the most relevant information and span the time period I am looking at the best. Because of this, these catalogs will surely enhance my project, they will illuminate the whole topic with their specific kept record of what has been required to acquire a degree in mathematics. article.